



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONERS OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/938,411	08/23/2001	Wan-Thai Hsu	UOM 0210 PUSP	9988
7590	11/15/2002			
David R. Syrowik Brooks & Kushman P.C. 22nd Floor 1000 Town Center Southfield, MI 48075-1351			EXAMINER DOUGHERTY, THOMAS M	
			ART UNIT 2834	PAPER NUMBER

DATE MAILED: 11/15/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/938,411	Applicant(s) HSU ET AL. 
	Examiner Thomas M. Dougherty	Art Unit 2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 29 October 2002.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 1-7, 23 and 24 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 8-22, 25 and 26 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) 1-7, 23 and 24 are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 23 August 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 and 6.
- 4) Interview Summary (PTO-413) Paper No(s) _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 8, 9, 12, 13, 15-19 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen et al. (US 5,491,604). Nguyen et al. show (fig. 1B) a micromechanical device comprising a substrate (29a); a first micromechanical structure (27a) supported on the substrate (29a) and having a first vertical sidewall (27); a second micromechanical structure (25) supported on the substrate (29a) and having a second vertical sidewall; and a first submicron lateral gap between the first and second vertical sidewalls to increase electromechanical coupling of the first and second micromechanical structures. Note at col. 2, ll. 37-40 that the whole length of the device is on the micron level and therefore it is obvious that the spacing between the components is on the submicron level. The second micromechanical structure (25) comprises an electrode. The first micromechanical structure (27a) is a lateral resonator. The first micromechanical structure (27a) has a third vertical sidewall and wherein the device further comprises a third micromechanical structure (also 25) supported on the substrate (29a) and having a fourth vertical sidewall and a second submicron lateral gap between the third and fourth vertical sidewalls to increase electromechanical coupling of the first (27a) and third (25) micromechanical structures. As the device is a resonator,

the fingers (27a) can flex, thereby constituting a flexural-mode resonator beam. The substrate is a semiconductor substrate. The semiconductor substrate is a silicon substrate. The first submicron lateral gap is a capacitive gap. The second and third micromechanical structures (25) are electrodes. The first and second submicron lateral gaps are capacitive gaps.

Claims 8-10, 12, 13, 15-20 and 22 are rejected under 35 U.S.C. 102(1B) as being anticipated by Adams et al. (US 5,914,553). Adams et al. show (figs. 9, 10) a micromechanical device comprising a substrate (62); a first micromechanical structure (52) supported on the substrate (112) and having a first vertical sidewall; a second micromechanical structure (82) supported on the substrate (112) and having a second vertical sidewall; and a first submicron lateral gap between the first and second vertical sidewalls to increase electromechanical coupling of the first and second micromechanical structures. Given that the device is on a micron scale, it is obvious that the spacing between the components is on the submicron level. The second micromechanical structure (82) comprises an electrode. The first micromechanical structure (52) is a lateral resonator. The first micromechanical structure (52) has a third vertical sidewall and wherein the device further comprises a third micromechanical structure (80) supported on the substrate (112) and having a fourth vertical sidewall and a second submicron lateral gap between the third and fourth vertical sidewalls to increase electromechanical coupling of the first (52) and third (82) micromechanical structures. As the device is a resonator, its fingers can flex, thereby constituting a flexural-mode resonator beam. The substrate is a semiconductor substrate. The

semiconductor substrate is a silicon substrate (see col. 9, ll. 12-15). The first submicron lateral gap is a capacitive gap. The second and third micromechanical structures (80, 82) are electrodes. The first and second submicron lateral gaps are capacitive gaps. The electrodes are metal (122).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 5,491,604) in view of Ella (US 6,204,737). Given the invention of Nguyen et al. as described above, they fail to note their electrode material as being metal. Ella notes use (col. 4, lines 5-10) of metal for electrode material in his microelectromechanical device. His device is not a resonator. It would have been obvious to one having ordinary skill in the art to employ a metal for the material of an electrode, such as is shown by Ella, at the time of the invention of Nguyen et al. and in the invention of Nguyen et al. since this material is well known for such use, readily available, can be chosen for specific and known characteristics, e.g. strength, conductivity, bonding ability, etc. Additionally, it would have been obvious to one having ordinary skill in the art to use a metal material for electrodes, since it has been held to be within the general skill of a worker in the art to select a known material on the

basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claims 10, 11, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 5,491,604) in view of Asano (US 6,316,827). Given the invention of either Nguyen et al. or Adams et al. as described above, they fail to note their electrode material as being metal and/or a metal plate. Asano notes use (claims 9 and 10) of metal plate for electrode material in his invention. His invention is not a resonator. It would have been obvious to one having ordinary skill in the art to employ a metal comprising a metal plate for the material of an electrode, such as is taught by Asano, at the time of the invention of Nguyen et al. and in the invention of Nguyen et al. since this material is well known for such use, readily available, can be chosen for specific and known characteristics, e.g. strength, conductivity, bonding ability, etc. Additionally, it would have been obvious to one having ordinary skill in the art to use a metal material for electrodes, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claims 11 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al. (US 5,914,553) in view of Asano (US 6,316,827). Given the invention of Adams et al. as described above, they fail to note their electrode material as being a metal plate. Asano notes use (claims 9 and 10) of metal plate for electrode material in his invention. His invention is not a resonator. It would have been obvious to one having ordinary skill in the art to employ a metal comprising a metal plate for the

material of an electrode, such as is taught by Asano, at the time of the invention of Adams et al. and in the invention of Adams et al. since this material is well known for such use, readily available, can be chosen for specific and known characteristics, e.g. strength, conductivity, bonding ability, etc. Additionally, it would have been obvious to one having ordinary skill in the art to use a metal material for electrodes, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 5,491,604) or of Adams et al. (US 5,914,553) in view of Capurso et al. (US 6,305,779). Given the invention of Nguyen et al. or of Adams et al. as described above, they fail to note the material of their lateral resonator. Capurso et al. note use (col. 1, lines 20-30) of polysilicon resonators for the material of resonators in microelectromechanical devices. The device, while comprising resonant components, is an ink jet printing structure. It would have been obvious to one having ordinary skill in the art to employ polysilicon for the material of the resonator, such as is taught by Capurso et al. at the time of the invention of Nguyen et al. or Adams et al. and in the invention of Nguyen et al. or Adams et al. since this material is well known for such use and readily available. Additionally, it would have been obvious to one having ordinary skill in the art to use a polysilicon material for the resonators, since it has been held to be within the general skill of a worker in the art to select a known material on the basis

of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 5,491,604) in view of Yazdi et al. (US 6,167,757). Given the invention of Nguyen et al. as described above, they fail to note the material of their electrodes. Yazdi et al. note use (col. 7, lines 30-33) of polysilicon for the material of their electrodes in their microelectromechanical devices. The device, while comprising resonant components, is a sensing device. It would have been obvious to one having ordinary skill in the art to employ polysilicon for the material of the electrodes, such as is taught by Yazdi et al. at the time of the invention of Nguyen et al. and in the invention of Nguyen et al. since this material is well known for such use and readily available. Additionally, it would have been obvious to one having ordinary skill in the art to use a polysilicon material for the electrodes, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 5,491,604) or Adams et al. (US 5,914,553). Given the invention of Nguyen et al. or Adams et al. as described above, they fail to note the material of their method of forming the electrode. The method of forming a device is not germane to the issue of patentability of the device itself. *In re Brown* 173 USPQ 685, *in re Fessman* 180 USPQ 324. Therefore this description does not carry any patentable weight.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Suzuki ('806) shows a microactuator device with a plurality of components on a substrate. MacDonald et al. ('133) and Dyck et al. ('913) each show micromechanical resonators which rely on capacitive gaps and which each comprise a plurality of components on a substrate.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

TM
lmd

November 14, 2002

Thomas M. Dougherty
THOMAS M. DOUGHERTY
PRIMARY EXAMINER
EROLIN 2000
2834